

Application No. 10/614,480  
Amendment dated January 5, 2006  
Reply to Office Action of October 5, 2005

**AMENDMENTS TO THE CLAIMS:**

This listing of claims will replace all prior versions, and listings, of claims in the application.

**Listing of Claims:**

1. (Currently Amended) A solid state image pickup device comprising:
  - a photoelectric converting circuit for generating an electric signal proportional to a logarithm value of an incident light quantity;
  - an integrating circuit for integrating [[an]] the electric signal from the photoelectric converting circuit; and
  - an output circuit for outputting an output electric signal proportional to a value obtained by integrating the logarithm value of the incident light quantity based on [[an]] the electric signal integrated by the integrating circuit,
    - wherein a reference voltage for integrating [[an]]the electric signal from the photoelectric converting circuit is applied to the integrating circuit, and an electric potential of the reference voltage is variable and
    - wherein when [[an]] the electric signal obtained by integrating in the integrating circuit is led to the output circuit, the electric potential of the reference voltage is temporarily changed.
2. (Canceled)
3. (Currently Amended) A solid state image pickup device according to claim 1,
  - wherein [[the]] an image signal is obtained by integrating [[an]] the electric signal generated from the photoelectric converting circuit at the time of an image pickup operation by means of the integrating circuit, and [[the]] a noise signal is obtained by integrating [[an]] the electric signal generated from the photoelectric converting circuit at

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the time of detecting a noise occurring due to the photoelectric converting characteristics of the photoelectric converting circuit by means of the integrating circuit.

4. (Original) A solid state image pickup device according to claim 3, wherein the output circuit includes

first holding circuit for holding the image signal,  
second holding circuit for holding the noise signal,  
differential circuit for removing the noise signal from the image signal.

5. (Currently Amended) A solid state image pickup device according to claim 1 further comprising:

an amplifier for amplifying [[an]] the electric signal integrated by the integrating circuit.

6. (Currently Amended) A solid state image pickup device comprising:  
a photoelectric converting element for generating [[an]] first electric signal according to a quantity of incident light;

an MOS transistor, to which a predetermined bias voltage is applied and which converts [[an]] the first electric signal output from the photoelectric converting element into [[an]] a second electric signal proportional to a logarithm value of the incident light quantity so as to output [[an]] the second electric signal;

a capacitor, in which [[an]] the second electric signal output from the MOS transistor is given to its one end so as to be integrated; and

an output signal line for outputting [[an]] a third electric signal obtained by integration by means of the capacitor; and

a first switch for electrically connecting and disconnecting the capacitor and third electric signal to the output signal line,

wherein a reference voltage whose electric potential is variable is applied to the other end of the capacitor and wherein the electric potential of the reference voltage is changed in synchronization with an ON/OFF operation of the first switch.

7. (Canceled)

8. (Currently Amended) A solid state image pickup device according to claim 6 further comprising:

a second switch for electrically connecting and disconnecting the photoelectric converting element and the MOS transistor,

wherein the electric potential of the reference voltage to be applied to the capacitor is changed when [[an]] the third electric signal, which is obtained by accumulating [[an]] the second electric signal output from the MOS transistor into the capacitor in the state that the second switch is OFF, is led to the output signal line as [[the]] a noise signal for the purpose of a difference in the sensitivity due to threshold characteristics of the MOS transistor is detected.

9. (Currently Amended) A solid state image pickup device according to claim 6 further comprising:

a second switch for electrically connecting and disconnecting the photoelectric converting element and the MOS transistor,

wherein the electric potential of the reference voltage to be applied to the capacitor is changed when [[an]] the third electric signal, which is obtained by accumulating [[an]] the second electric signal output from the MOS transistor into the capacitor in the state that the second switch is ON, is led as [[the]] an image signal to the output signal line for [[the]] an image pickup operation is performed.

10. (Currently Amended) A solid state image pickup device according to claim 6 further comprising:

a second switch for electrically connecting and disconnecting the photoelectric converting element and the MOS transistor,

wherein the electric potential of the reference voltage to be applied to the capacitor is changed when [[an]] the third electric signal, which is obtained by accumulating [[an]] the second electric signal output from the MOS transistor into the capacitor in the state

that the second switch is OFF, is led to the output signal line as [[the]] a noise signal for the purpose of a difference in the sensitivity due to threshold characteristics of the MOS transistor is detected, and

wherein the electric potential of the reference voltage to be applied to the capacitor is changed when [[an]] the third electric signal, which is obtained by accumulating [[an]] the second electric signal output from the MOS transistor into the capacitor in the state that the second switch is ON, is led as [[the]] an image signal to the output signal line for [[the]] an image pickup operation is performed.

11. (Original) A solid state image pickup device according to claim 10, wherein the reference voltage has ternary.

12. (Original) A solid state image pickup device according to claim 11, wherein a change width of the electric potential of the reference voltage at the time of leading the image signal is set to be larger than a change width of the electric potential of the reference voltage at the time of leading the noise signal.

13. (Currently Amended) A solid state image pickup device comprising a plurality of pixels and an output signal line for leading output signals output from the pixels,

wherein each of the pixels has

a photoelectric converting element for generating [[an]] a first electric signal according to a quantity of incident light,

a MOS transistor to which a predetermined bias voltage is applied and which converts [[an]] the first electric signal output from the photoelectric converting element into [[an]] a second electric signal proportional to a logarithm value of the incident light quantity so as to output an electric signal,

a capacitor in which [[an]] the second electric signal output from the MOS transistor is given to its one end so as to be integrated and of which a reference voltage whose electric potential is variable is applied to the other end,

a first switch for electrically connecting and disconnecting the photoelectric converting element and the MOS transistor, and

a second switch for electrically connecting and disconnecting the integrating capacitor and the output signal line,

wherein when an image pickup operation is performed, [[an]] the second electric signal, which is obtained by logarithmically converting an electric signal from the photoelectric converting element by means of the MOS transistor in a state that the first switch is ON, is integrated by the capacitor so that an image signal is generated, and the image signal is output to the output signal line in a state that the second switch is ON,

wherein when dispersion of sensitivity of the pixels is detected, a noise signal is generated in such a manner that the capacitor integrates [[an]] the second electric signal according to threshold characteristics of the MOS transistor in a state that the first switch is OFF, and the noise signal is output to the output signal line in a state that the second switch is ON, and

wherein the electric potential of the reference voltage is changed in synchronization with at least one of the operation of the second switch at the time of the image pickup operation and detecting the dispersion of sensitivity of the pixels.

14. (Original) A solid state image pickup device according to claim 13,  
wherein when the noise signal and the image signal are output to the output signal line respectively, the electric potential of the reference voltage is changed.

15. (Original) A solid state image pickup device according to claim 14,  
wherein a change width of the electric potential of the reference voltage at the time of leading the image signal is set to be larger than a change width of the electric potential of the reference voltage at the time of leading the noise signal.

16. (Original) A solid state image pickup device according to claim 13,  
wherein the MOS transistor is a P-channel MOS transistor.

17. (Original) A solid state image pickup device according to claim 16,

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wherein the electric potential of the reference voltage is changed to a negative direction in synchronization with an operation of the second switch.

18. (Original) A solid state image pickup device according to claim 13, wherein the MOS transistor is an N-channel MOS transistor.

19. (Original) A solid state image pickup device according to claim 18, wherein the electric potential of the reference voltage is changed to a positive direction in synchronization with an operation of the second switch.

20. (Currently Amended) A solid state image pickup device according to claim 13,

wherein each of the pixels further includes an MOS transistor operating as amplifier for amplifying [[an]] the second electric signal integrated by the capacitor and leading an electric signal amplified to the output signal line.